

## Forschungsfahrt M190 des FS METEOR

### Fünfter Wochenbericht vom 09. Juli 2023

Research activities in our working area came to completion in the late afternoon of July 4 and we are nearing the end of a long transit that began west of the Azores. In the early morning hours of the approaching Monday we will cross the Strait of Gibraltar and shortly thereafter enter Algeciras.

We spent the final two days in the working area with a last dive to the hot springs of the Menez Gwen hydrothermal field. As in the Bubblyon hydrothermal field four kilometers to the south, which was sampled last Sunday, 300°C hot, very gas-rich solutions escape from the seafloor there. The high methane and hydrogen sulfide contents of the venting solutions provide abundant food for the chemosynthesizing microorganisms that form the basis of the food webs in the unique ecosystems of deep-sea hydrothermal vents. Flame-like, the boiling solutions shoot from the vents of Menez Gwen's vents (Fig. 1). But the steam bubbles reflect the light from the spotlights and merely simulate flames.



*Fig. 1: The vents in the Menez Gwen hydrothermal field look as if flames were flickering from them. The impression is deceptive: we see the light from the spotlights reflecting off vapor bubbles in the boiling fluids. At a water depth of 800 m, seawater boils at about 300°C. Photo: MARUM*

At the seafloor of Menez Gwen, hydrothermally formed crusts are found in abundance (Fig. 2). Where they are broken open, warm waters flow out in which shrimp bathe. This is also where mussels prefer to settle. Thus, crust formation appears to play an important role in the development of Menez Gwen habitats. Therefore, we want to investigate the formation mechanisms of these crusts. Consequently, they were sampled at several sites at once, always including a fluid sample from the same site, as is our practice. Indeed, from the composition of the fluids, predictions can be made as to which minerals should form when the hot solutions mix with the surrounding seawater. At the same time, conclusions about the formation conditions can be drawn from the structure of the crusts.

*Fig. 2: At the warm spring called "Woody" in the Menez Gwen hydrothermal field, mussels have settled on a cemented plate through whose cracks warm solutions rise. Photo: MARUM.*



The lavas of Menez Gwen are also interesting. They have an unusual composition for basalts from mid-ocean ridges. In addition, they form bizarre lava tubes, which are piled up to rugged hills and are sometimes colonized by deep-sea corals (Fig.3).



*Fig. 3: Lava flows form the main part of the volcanic cone that hosts the Menez Gwen hydrothermal field. Corals and sponges readily colonize the ridges formed by the cooled lava. Photo: MARUM*

After twelve successful dives, eleven CTD deployments and 19 multibeam echo sounder stations, the M190 cruise can be successfully concluded tomorrow. The harmonious cooperation on board as well as the reliability of the ship and the equipment brought along during the whole cruise made the scientific management of this cruise an easy task for me. The whole science team thanks Captain Korte and the complete crew of the research vessel Meteor for the fantastic support during the entire course of the expedition.



*Fig. 4: A nice picture of the Meteor in Las Palmas before the start of the voyage more than four weeks ago. Photo: Silke Wetzel.*



*Fig. 5: Group photo taken a few days before the end of the trip*

With best regards also on behalf of all who participated in expedition M190,

Wolfgang Bach

At sea, 36°N, 7°W